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THE STATUS OF THE GENUS ALHAGI GAGNEB. IN HEDYSAREAE S.L.

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Subtribe *Alhagiinae* DC. ('Alhageae') is one amongst the ambiguous subtribes of *Hedysareae* DC. s.l. It was originally described in 1825 with two genera *Alhagi* Gagnep. and *Alysicarpus* Desv. and characterised by 'Flores recemosi aut spicati. Legumina teretiuscula' although its type-genus *Alhagi* does not fulfil consistently the prime requirement *i.e.* jointed pod character of the tribe *Hedysareae.* In that sense the tribe *Hydysareae* s.l. itself was a heterogenous group and was variously treated in different times.However the above ambiguity was first pointed out by Bentham (1865) who did not recognise the subtribe *Alhagiinae.* Genus *Alysicarpus* has been replaced to a newly created subtribe *Desmodiinae* Benth. ('Desmodieae') and the so-called type-genus *Alhagi* included under subtribe Euhedysarinae DC. ('Euhedysareae') as an 'exception'

Hutchinson (1964) stressed on the phylogenetic relationships amongst the different taxa for tribal delimitations. He considered the Bentham's subtribal characters with some minor changes as good for distinct tribes. Accordingly most of the Bentham's subtribes like, *Aeschynomeninae* ('Aeschynomeneae'), *Desmodiinae* ('Desmodieae'), etc., have been raised to the distinct tribal status, thereby reducing the circumscription of the tribe *Hedysareae* s.l. to a considerable extent. Further some new ones like, *Lespedezeae, Pseudarthrieae,* etc.,have also been added comprising of the so-called unusual members, except the genus *Alhagi* which despite of its ambiguities has been retained under the tribe *Hedysareae* s.s..

Polhill (1981) advocated the implementation of the cryptic features, *i.e.* the information available from different other disciplines like, Cytology, Palynology, Anatomy, Chemistry, etc. for tribal delimitations. According to him *Alhagi* is removed in true sense from *Hedysareae* to be placed in *Galegeae* (Bronn) Torrey et Gray s.s. under subtribe *Astragalinae* (Adans.)Benth. with belief that "although the ground plan is that of the *Galegeae,* there are no obvious connections at generic level, though *Hedysareae* and *Loteae* show least divergence from the *Astragalinae"* In fact some apparent similarities in characteristics of *Alhagi* as have been observed by Polhill with those of some members of *Astragalinae (Galegeae)* can hardly establish this transfer. For instance, irregularly moniliform pods of *Alhagi* never remind *Glycyrrhiza* L. rather than those of occasional occurrence in some species of *Aeschynomene* L., and *Ormocarpum* Beauv. *(Aeschynomeneae)*. Its veinless pod-texture can be compared with some old specimens that of *A. sensitiva* L. whereas in *Astragalinae*, it is transversely veined. Moreover, shortly petiolate, 1-foliolate leaves are also not uncommon in the tribe *Hedysareae* s.s. [eg. in *Taverniera cuneifolia* (Roth) Arnott]. Besides these, although *Alhagi* is morphologically quite distinct from *Eversmannia* Bunge and *Ebenus* L. *(Hedysareae)* still these are usually compared together only because they display unique co-adaptation with animals for their defence. As a measure of protective device the floral rachis in *Alhagi* ends in floriferous spine whereas in *Eversmannia* or *Ebenus* the petiole or leaf-rachis ends in stiff spine and these phenomena are analogous in function. Further, the unique ornithochorous pod-character (pods curved like bird's nail) of *Ornithopus* L. [*Coronilleae* (Adans.) Boiss.] is common in *Alhagi maurorum* Tourn. ex Medic. However, these phenomena of such tropical legumes need detailed field study, microscopical analysis and biological interpretation. Ohashi (1971) found that palynologically *Alhagi* is closer to *Eversmannia* than *Ebenus* or any member of Galegeae although he concluded that 'the difference in the pollen type is not related to that in gross morphology Besides these, Polhill himself was not satisfied with the systematic position/status of *Alhagi* as he said '..... Neverthless, *Alhagi* remains somewhat isolated and if placed, as here, in *Galegeae*, it remains relatively close to *Hedysareae*'

Present critical and comparative study on *Alhagi* and other relevant taxa reveals that mere transfer of the genus in different tribes can not bring any positive solution for its systematic position unless the traditional subtribe *Alhagiinae* can be revived to constitute a distinct monotypic tribe with all of its unique characteristics. Morphological distinctness of *Alhagi* in having obtuse keel; regularly produced single floriferous spines; irregularly moniliform pods lacking typical venation pattern, etc., from those of *Hedysareae* s.s, find quite consistent and these characters can readily be treated as tribal characters. After going through all the available findings Polhill has also come to the conclusion that the tribe *Hedysareae* s.s, is derived from the astragaloid part of *Galegeae*, while *Alhagi* served the purpose of a linking bridge between the two tribes. In fact, an independent tribe *Alhagieae* can serve the same purpose more effectively. Goldblatt (1981) has deduced the basic chromosome number of the genus *Alhagi* to $X = 8$. This points towards its (hence in tribal status as well) derivation from *Galegeae* in which $n = 8$ is common and rather uniform among the Old World members of *Astragalus* L. ($X = 8$).

A recent Scanning Election Microscopic study on seed-coat morphology of different members of *Hedysareae* s.l. (Thothathri and Pramanik 1986) have shown promising results and brought into light newer information as an aid in the better interpretation of relationships and evaluation of evolutionary tendencies among its different sister tribes. Seeds in *Alhagi* are usually flat, hilum elongated with micropylar opening insignificant and not raised.The sporoderm is irregularly reticulate, thereby enclosing small to large areas in between and the ridges vary in size and shape. 'A perusal of the SEM observation further reports 4 broad types of sporoderm patterns such as (1) smooth to reticulate type in *Hedysareae* s.s. (2) rugose type in *Aeschynomeneae*, (3) rugose to reticulate type in *Desmodieae* and finally (4) the reticulate type in the genus *Alhagi* which does not fit satisfactorily into any of the above tribes. Further study on the line with the members of *Galegeae* is yet to be undertaken.

However, in the light of the above critical observations both in micro-and macromorphic characters and to bring a satisfactory solution to the systematic position of the genus *Alhagi*, subtribe *Alhagiinae* DC. of the tribe *Hedysareae* DC. s.l. is hereby raised to the distinct tribal status based on the type-genus *Alhagi*.

Tribe **Alhagieae** (DC.) Pramanik et Thoth. stat. nov.

Tribe *Hedysareae* subtribe *Alhagiinae* DC. Prodr. 2 : 352. (Nov.) 1825 'Alhageae'; Sweet, Hort. Brit. ed. II. 152. 1830; Wight et Arnott, Prodr. 1 : 232. 1834; Endlicher, Gen. Pl. 1287. 1840; Led, Flora Rossia 1 : 715. 1842.

Tribe *Galegeae* subtribe *Astragalinae* (Adans.) Benth. *sensu* Polhill in Polhill et Raven (ed.), Adv. Leg. Syst. part 1, 360-363. 1981 (p.p., quad gen. *Alhagi* cit.).

Woody shrubs, shrublets or herbs; moderately branched. Leaves epulvinate, 1-foliolate, subsessile or shortly petioled, glabrous above or pubescent on both surfaces, hairs eglandular, frequent anomocytic stomata on both surfaces; stipules small, free, often deciduous or caducous. Flowers red or purple, distant, few, solitary or paired in axillary racemes, peduncles uniformly spinescent at apex; bracts and bracteoles small, free, calyx campanulate, with short inflated hypanthium at base in fruit, calyx-teeth short, subequal, acute, sinuses at same level. Corolla subequal, not persistent in fruit; vexillum shortly clawed and auricled; wings falcate oblong, free, auricles much short; keels shortly incurved above, obtuse, auricles minute. Stamens diadelphous, (9) + 1, vexillary stamen free, others medianly jointed; anthers uniform, dorsifixed. Ovary subsessile, many ovuled, linear, non-septate, glabrous or adpressed pubescent; ovules uniseriate; style shorter than ovary, filiform, incurved, glabrous; stigma small, terminal. Pods terete, sparingly hairy or glabrous, veinless, coarse surface, indehiscent, irregularly moniliform, curved during maturity; joints not separating. Seeds reniform, estrophilate; embryo covered with fleshy membrane.

Pollen: Pollen 2–3-colporate, fine reticulate, sculptured exine, long colpus with granulate in one row, without constriction and slightly protruding at the equator, the rest parts more or less introding and bordered by the endexine thickening, lateral margins of the endoaperture rather diffuse.

Chromosome : 2n = 16.

Type-genus : *Alhagi* Tourn. ex Gagneb.

Distribution : Dry habitats or more arid regions of N. Africa, Europe and W. Asia. In India the tribe is confined to western region; also reported from Central (Madhya Pradesh) and Northern (Uttar Pradesh) India.

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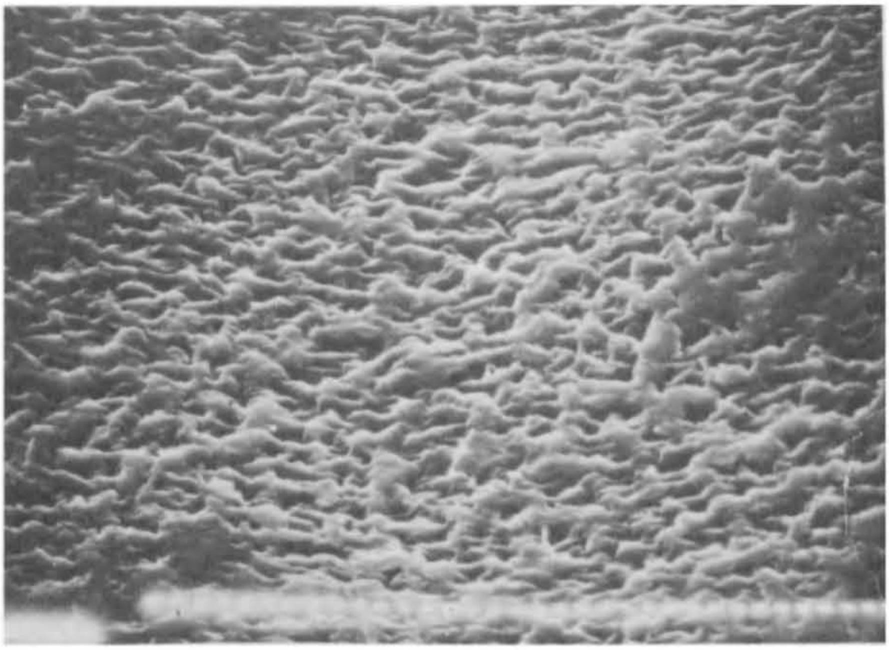

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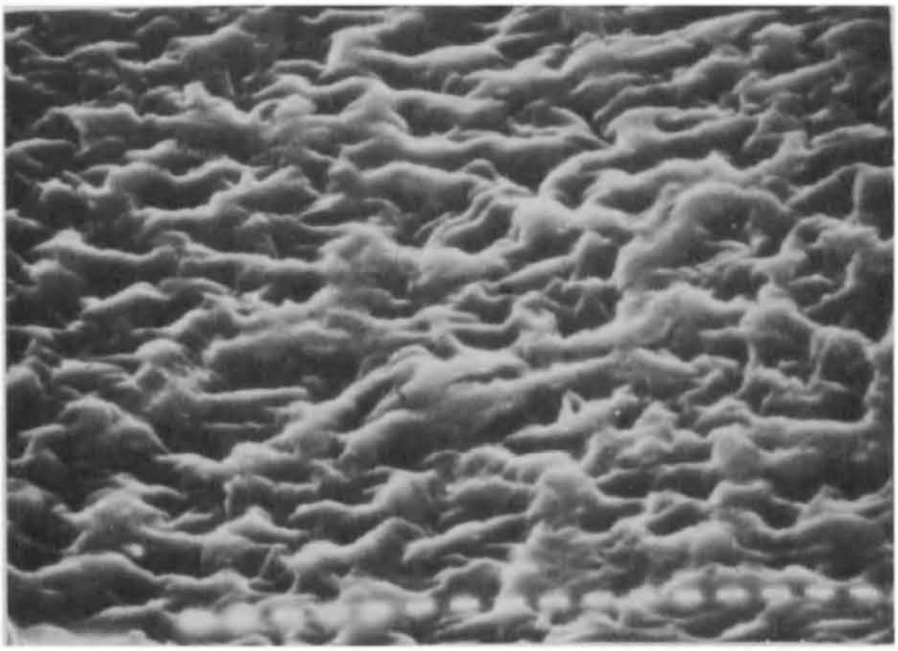

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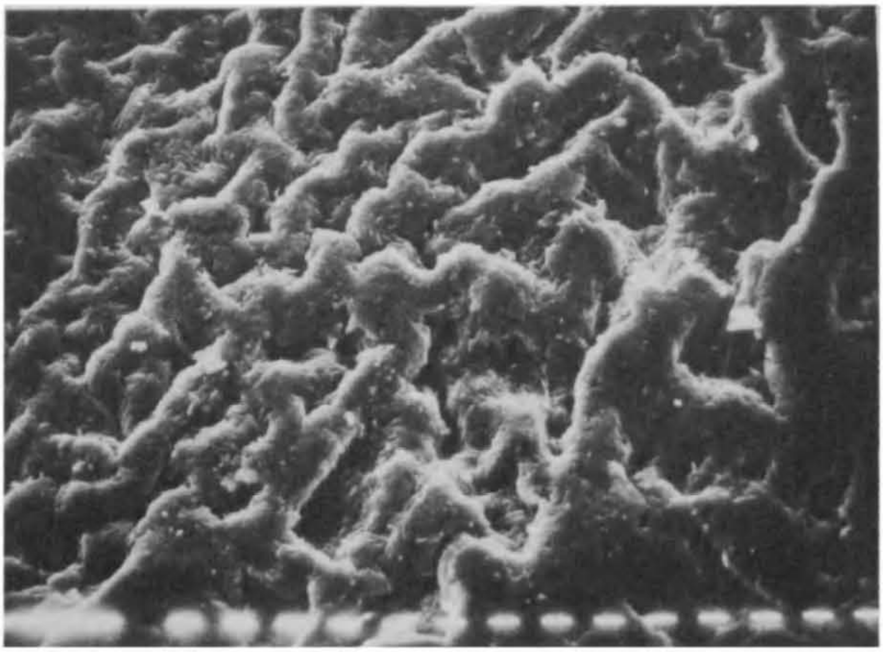

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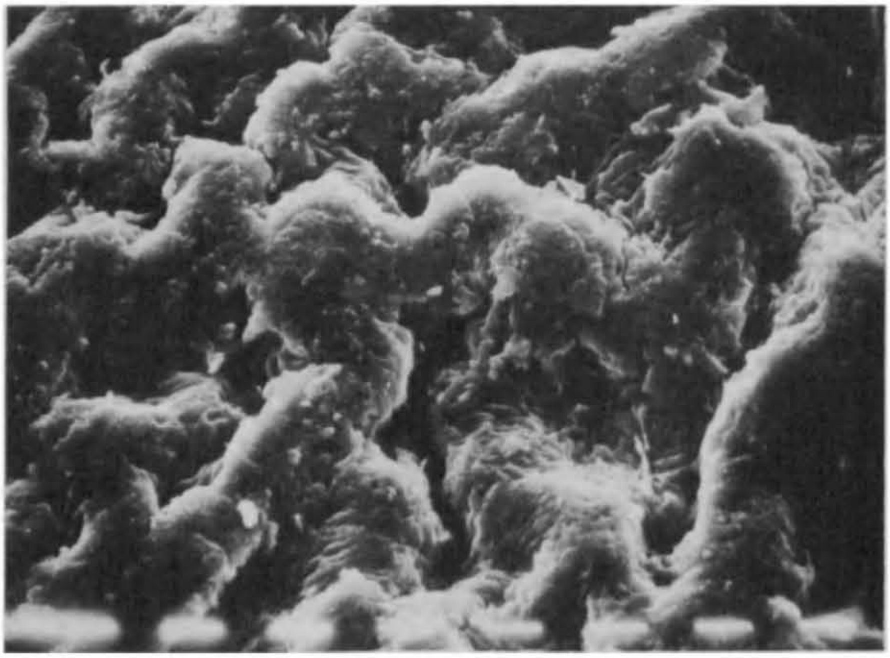

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